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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,114	04/08/2004	Yoshihiko Imanaka	042307	8372
38834 7590 08/27/2007 WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			EXAMINER DANG, TRUNG Q	
			ART UNIT 2823	PAPER NUMBER
			MAIL DATE 08/27/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/820,114

Applicant(s)

IMANAKA ET AL.

Examiner

Trung Dang

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 13-19 and 47-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-19 and 47-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 13-18, 47, and 50-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Renn (US 2003/0048314 of record) in view of Hatono (US 7,175,921).

Renn teaches a method of fabrication active and passive components on a circuit substrate (para. [0108]), which includes deposition of conductors, resistors, dielectrics (para.[0097]), inductor (Fig. 13 and related text), interconnects (para. [0139]), said method comprising a film forming step, said film forming step forming at least one of said dielectric film, said resistor film and said conductor film by ejecting dry aerosol of fine solid particle material with a carrier gas (para. [0130]). Note that, as disclosed in para. [0130], the droplets are dried by the sheath gas, resulting in dried particles deposited on the substrate, hence the disclosed aerosol is a **dry** aerosol as claimed. For the claimed limitation regarding the carrier gas, see para. [0055].

Renn differs from the claims in not disclosing that the dry aerosol is ejected into reduced pressure environment with a speed of 200-400 m/second as now recited in independent claims 13, 47, 50 and 51, even though Renn teaches particle velocities of about 100 m/second, and that greater speeds should be possible (bottom of para. [0131]).

In the same field of endeavor, Hatono teaches an aerosol deposition process in which a substrate is bombarded with a particle beam with a velocity within a range from 50-450 m/second (col. 10, lines 10-17), and the particle beam is ejected into a reduced pressure environment inside the deposition chamber (Fig. 1, and col. 12, lines 45-47). Note that the pressure inside the aerosol generator 103 is higher than the reduced pressure in the deposition chamber 106 because nitrogen carrier is introduced into the aerosol generator 103 (col. 12, lines 25-27) to effectuate an ejection of particle beam from a high pressure environment to a low pressure environment.

It would have been obvious to one of ordinary skill in the art to perform the dry aerosol deposition process of Renn using particle speed and reduced pressure taught by Hatono because using known process parameters of related technique for depositing a film would have been within technical grasp of one skilled in the art so as to achieve predictable results of forming a high quality film (see Hatono, col. 10, lines 27-34).

For claims 14 and 18, see Renn, para. [0160] for the disclosure that the disclosed process can be used to deposit electronic materials onto polymer substrate which includes resin because resin is a polymer.

For claim 17, see Renn, paras. [0106] and [0115] for the particle size.

For claim 47, because the disclosed method includes fabrication of metal interconnects, and further discloses that dry aerosol of fine particle can be used to deposit dielectric therefore the claimed limitation "interlayer insulation film and a conductor layer are laminated" is met.

For claims 50 and 51, Renn's process is an impact activation process because the films are deposited by impaction of particles on the substrate.

3. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Renn taken with Hatono as applied to claims 13-18, 47, and 50-51 above, and further in view of Matsuo (US 6,504,227 of record).

The combined process of Renn and Hatono teaches a dry aerosol process for making an inductor as described above. The combination differs from the claim in not disclosing the step of planarizing the surface after the inductor film are formed. Matsuo teaches a process of making an inductor in which after the inductor film 14 are formed on a substrate, an planarization process is employed (Fig. 3C and related text).

It would have been obvious to one of ordinary skill in the art to modify teaching of the combined process by performing a planarizing process as claimed

because such process is well known in the art as suggested by Matsuo to provide a planar surface so that the formation of metal wires on the substrate would be easier without breaking the metal wires.

4. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Renn taken with Hatono as applied to claims 13-18, 47, and 50-51 above, and further in view of Hara et al. (US 2001/003122 of record).

The combined process Renn and Hatono teaches a process as described above, including a process of making interconnects wherein the dielectric (interlayer insulation) is formed by a dry aerosol process. The combination differs from the claim in not disclosing the technique of which the metal interconnects are formed. Hara teaches a metallic conductor layer can be formed by a publicly known dry plating method such as sputtering, CVD, vacuum evaporation or a wet plating method such as electrolytic plating and non-electrolytic plating (para. 0041).

It would have been obvious to one of ordinary skill in the art to employ any dry or wet plating method suggested by Hara in forming the interconnects conductive layer because the application of a well-known process to make the same would have been within the level of an artisan and require no more than a general knowledge of one skilled in the art.

5. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Renn taken with Hatono as applied to claims 13-18, 47, and 50-51 above, and further in view of Hasegawa et al. (US 6,717,218 of record).

The combined process Renn and Hatono teaches a process as described above, including a process of making interconnects wherein the dielectric (interlayer insulation) is formed by a dry aerosol process.

The combination differs from the claim in not disclosing a connection hole in the interlayer insulation film is formed by using a HF acid while masking said interlayer insulation film as claimed.

Hasegawa teaches a process for forming contact holes in an interlayer insulation film 12/13/14 by using HF acid while masking the interlayer insulation film with a photoresist layer 160 (Fig. 3C and col. 8, lines 18-22).

It would have been obvious to one of ordinary skill in the art to employ the wet etching method as suggested by Hasegawa in forming interconnect holes in the interlayer insulation film of the combined process because the application of a known process to make the same would have been within the level of an artisan and require no more than a general knowledge of one skilled in the art.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitation regarding the velocity range recited in claim 15 is not further limited the speed range recited in the base claim 13.

***Response to Arguments***

7. Applicant's arguments with respect to claims 13, 47, 50-51 have been considered but are moot in view of the new ground(s) of rejection.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trung Dang whose telephone number is 571-272-1857. The examiner can normally be reached on Mon-Friday 9:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through



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Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Trung Dang  
Primary Examiner  
Art Unit 2823

8/20/07